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EFFECTIVE MARGINAL TAX RATES IN AUSTRALIA

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The households included in the 1988-89 ABS Household Expenditure Survey were grouped according to size, degree of labour force participation, and weekly household private income. Households at similar levels of income were then compared to determine the effect on disposable income of a small increase in labour market earnings, resulting in higher taxes paid and lower benefits received. A wide range of direct and indirect taxes and direct and indirect benefits was included in the calculation. Effective marginal tax rates were calculated as the ratio of increased taxes plus reduced benefits to the postulated increase in earnings. Effective marginal tax rates were found to be generally higher for households in the bottom half of the household disposable income distribution than in the top half.

1. INTRODUCTION

Australia's system of welfare payments is intended to be targeted at those groups considered to be in need. Many types of payments are means tested, including all major social security and veterans pensions and allowances, although the income thresholds vary from one type of payment to another. On the tax side, the income tax system is designed partly with ability to pay in mind. The combined effect of the tax/transfer system is to generate relatively high effective marginal tax rates (EMTRs) at low levels of income. The EMTR is the extra tax paid plus the reduction

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in means tested benefits received as a result of a one dollar increase in private income. High EMTRs are of concern because they act as a disincentive to work, with obvious effects on the efficiency of resource use, and because they make it difficult for people to raise their after-tax, after-transfer income through their own efforts, thereby perpetuating poverty traps.

Various studies have used estimates of EMTRs to analyse the efficiency and effectiveness of income redistribution measures, or to estimate the efficiency effects of the tax system. Australian studies include an analysis of income redistribution by Bascand and Porter (1986), and an estimate of the cost of public funds by Findlay and Jones (1982). Both of these studies need to be up-dated to take account of significant changes in the tax-transfer system which have occurred in the last decade. Harding and Polette (1995) have recently published estimates of the EMTRs experienced by individuals ranked by decile of equivalent disposable family income. Harding and Polette's estimates are not ideally suited for analysing the labour supply effects of changes in the tax/transfer system for several reasons. First, their estimated EMTRs are for families whereas labour supply elasticities are generally estimated for individuals or households. Secondly, they group families in deciles according to equivalent disposable family income – income adjusted for family composition and size according to the Henderson poverty equivalence scale (Saunders (1994) Ch. 8) – whereas labour supply studies are usually based on disposable income. Thirdly, they omit certain categories of taxes and transfers from their calculations: indirect taxes are excluded as are indirect benefits in the form of goods and services supplied by government to households.

The purpose of this paper is to present an alternative set of EMTR estimates for households grouped by disposable household income deciles which is derived from the 1988-89 Household Expenditure Survey (ABS (1992)) and which incorporates the effects of indirect taxes and benefits; to compare these estimates with the results of the Harding and Polette and previous studies; and to discuss briefly the implications of the results for the efficiency and effectiveness of the tax-transfer system.

2. ESTIMATES OF EFFECTIVE MARGINAL TAX RATES

Our estimates of EMTRs are derived from the 1988-89 ABS Household Expenditure Survey (HES) data consisting of demographic information, earnings, taxes paid and transfers received for a sample of 7225 households. These unit record data are derived from the same survey used to generate the ABS occasional publications 6537.0 "Household Expenditure Survey, Australia, The Effects of Government Benefits and Taxes on Household Income" and 6533.0 "Household Expenditure Survey, Australia, States and Territories". Information about direct benefits, such as age, invalid, Veterans Affairs and sole parent pensions, unemployment benefits, family allowances and other payments such as sickness benefits and education assistance is obtained directly from household responses to the HES. Various models are used to calculate the incidence of direct and indirect taxes and indirect benefits across household income deciles. The operation of these models is described briefly below, and a full description is available in Schneider (unpub).

Direct taxes, including personal income tax and medicare levies, were imputed to households according to the 1988-89 tax schedule, with rebates calculated according to household characteristics and tax eligibility criteria. Corporate taxes were not allocated to households (EPAC (1995)). Indirect taxes, defined as those taxes charged on "the production, sale, purchase or use of goods and services" (ABS (1992a)) included customs and excise duties, sales taxes, payroll taxes, primary production taxes, liquor and gambling taxes, motor vehicle taxes, stamp duties, broadcast and television station licences, regulatory service fees, and some other categories of fees, fines and taxes. Expenditure information obtained from the HES was translated to expenditure by the input-output classification of commodities, and then to values of industry output by means of the input-output model. Indirect taxes as a component of the value of industry output were then allocated to households by means of the industry-commodity matrix and the information on commodity expenditures by households, on the assumption that the incidence of indirect taxes was fully shifted to households.

Indirect benefits consist of Commonwealth, State and Local Government outlays on education, health, social security and welfare (excluding personal benefit payments), and housing. Government outlays on school, tertiary and special education were used to calculate an estimate of average student benefit for each type of student in each State or Territory; the average student benefits were then allocated to households on the basis of demographic information obtained from the HES and other surveys. Government outlays on hospitals, clinics, other institutional and non-institutional services and benefits, public health, pharmaceuticals, medical aids and appliances and research were allocated to individuals by means of hospital utilization and doctor visit rates according to age, sex and State or Territory of residence. The individual benefits were then allocated to households using the information contained in the HES. Social security and welfare outlays consist of sickness benefits, benefits to ex-servicemen and their dependents, invalid and other permanent disablement benefits, old age benefits, widows, deserted wives, divorcees and orphans benefits, unemployment benefits, family and child benefits, sole parents benefits, family and child welfare, and miscellaneous payments. The values of these outlays, together with data on the number of eligible recipients, are used to calculate the average benefit for each beneficiary category and the average benefits are allocated to households on the basis of information obtained from the HES. Housing benefits include benefits to households with government rental properties, and allocated benefits to first home buyers. The benefits to households with government rental properties were calculated as a proportion of the difference between the estimated private market rent and the actual rent paid. Private market rents, according to State, region, type of dwelling, structure and number of bedrooms, were obtained from the 1986 Census and inflated to December 1988 by means of the CPI, and actual rent paid was obtained from the HES.

As noted above, the EMTR is defined as the ratio of change in taxes paid less the change in value of benefits received to a small increase in household private income. Since taxes generally increase, and benefits fall, as income rises, the EMTR measures the increase in net taxes (ie. change in taxes less change in

benefits) expressed as a proportion of the income increase. EMTRs are calculated by comparing the tax and benefit experience of households with different levels of private income. Since characteristics such as household size, number of wage earners and household head aged 65 years or over affect taxes paid and benefits received independently of the level of private income, comparisons are conducted between households which are similar in respect to these major characteristics. An EMTR is calculated for each household type and private income level and households are then sorted into disposable income deciles and average EMTRs are calculated for each decile as described below.

The unit record data for households whose head was less than 65 years of age were divided into 24 subsets of households with the same number of household members and employed persons. A further 11 subsets were formed from households whose head was aged 65 years or over. Within each of the subsets, households were ranked according to weekly private income. They were then grouped in $50 ranges, to reflect the likely size of a change in earnings as a result of a marginal change in labour supply, and average private income, benefits and taxes were calculated for each group. Where a $50 range included a group of fewer than five households a wider range was used. A comparison of the average values of private income, taxes and benefits for each group with the average for the group in the preceding income range in the subset was used to calculate the EMTR for that group. This method of calculation meant that the households grouped in the lowest income range in each subset dropped out of the sample as there was no preceding group with which they could be compared. Each household in each income range in each subset was assigned the EMTR for that group and the subsets were then merged into a single sample.

The sample households, with their estimated EMTRs, were then assigned to disposable household income deciles where disposable income is defined as private income plus direct benefits less direct taxes paid. Sample average EMTRs are calculated for each disposable income decile and reported in Column 2 of Table 1; sample sizes are reported in Column 6.

It will be recalled that each household was allocated the average EMTR calculated for its income band within its demographic group. Since there are 35 demographic groups and an average of 12.5 income bands within each group, there is a total of 403 band/group clusters (net of the lowest band in each group) and the same number of EMTR estimates. When a household is assigned to a disposable income decile it takes with it the average EMTR of its cluster. This means that the same cluster average EMTR may appear more than once in the sample of EMTRs for a disposable income decile. The variance of the average EMTR in a disposable income decile is calculated as a weighted average of the variances of the cluster average EMTRs found in the decile, where the weights are the squares of the ratios of the number of observations drawn from each cluster to the total number of observations in the decile. The variance of the cluster EMTR is calculated as

$$\left(\sigma(i)^2/n(i) + \sigma(i-1)^2/n(i-1)\right)$$

where $\sigma(i)^2$ is the variance of EMTRs within cluster i, n is the number of

observations in the cluster, and i and i-1 refer to cluster i and the one immediately below it. This method of calculating the variance of the EMTR estimates obtained for each decile involves assuming that the observations in each cluster are randomly drawn from a normally distributed population, and that the covariances between means of adjacent clusters are zero.

The standard deviations of the EMTR estimates for the disposable income deciles are reported in Table 1, Column 3. The estimates are relatively high, especially for the first three deciles. This reflects the wide range of different circumstances faced by households in lower income bands, even within broadly similar demographic groups. Based on t-ratio one-tail tests the EMTRs estimated for deciles 4, 5, 6, 9 and 10 are significantly different from zero at the 0.05 level of significance.

3. COMPARISON WITH OTHER STUDIES

Our results can be compared with the earlier studies of Findlay and Jones (1982) and Bascand and Porter (1986). Findlay and Jones report unweighted EMTRs for households grouped according to 12 grades of taxable income in 1978-79. The EMTRs are obtained by adding the marginal income tax rate to average rates of indirect tax computed by Warren (1979). Findlay and Jones report lower EMTRs than our estimates for lower income groups, and higher EMTRs for the higher

TABLE 1

ESTIMATES OF AVERAGE EMTRs FROM TWO STUDIES

	Present Study					Harding/ Polette
(1) Disposable Income Decile*	(2) Unweighted EMTR	(3) Sample Standard Deviation	(4) Weighted EMTR	(5) Sample Standard Deviation	(6) Sample Size	(7) EMTR
1	.619	3.1974	.327	0.1331	385	.06
2	.732	2.0581	.327	0.0029	479	.23
3	.585	1.6371	.441	0.0015	593	.35
4	.678	0.3620	.703	0.0013	664	.32
5	.563	0.0959	.553	0.0007	691	.29
6	.483	0.1082	.484	0.0004	710	.31
7	.365	0.3268	.369	0.0015	697	.30
8	.435	0.6323	.445	0.0026	720	.32
9	.429	0.1601	.432	0.0002	715	.36
10	.423	0.1574	.427	0.0001	724	.38
					6378	

* Note that families were grouped by Disposable Equivalent Family Inome in the Harding and Polette study, and by Disposable Household Income Decile in the Campbell and Bond study. Weighted EMTRs are the sum of household EMTRs weighted by household shares in the labour earnings of the decile.

income groups. The higher EMTRs in the Findlay and Jones study are probably explained by the more progressive income tax structure which existed in 1978-79, while the lower EMTRs are probably explained by the fact that our calculations take account of benefits as well as taxes. Bascand and Porter (1986) use 1981-82 Income and Housing Survey data to calculate EMTRs for beneficiary and pensioner households, and for gross income quintiles of non-pensioner, non-beneficiary households. Their coverage of taxes and benefits is similar to ours except that they impute corporation and payroll taxes to households, but do not appear to impute indirect benefits. They report a structure of EMTRs which is less progressive than that estimated by Findlay and Jones, but more progressive than the structure we obtain from our approach.

A contemporary study for comparison is that of Harding and Polette (1995). Before comparing results, however, it should be noted that our study differs from theirs in several respects. Harding and Polette's calculations are based on the 1990 ABS Income Distribution Survey unit records, whereas our study is based on the 1988-89 HES. Also, in the former study, the Income Distribution Survey records were "aged" to provide estimates for 1994 and the sampled households were regrouped as a series of families (see Polette (1995) for details). Certain groups were excluded from their sample: those deemed to be unlikely to be in the labour force – principally children and persons aged 65 or over; and those whose family income was marginally below the threshold for the basic family payment income test. The effect on family disposable income of a change in earnings was estimated by simulating the effect of a one dollar increase in the earnings of each parent on the family's tax liability and entitlement to transfers. In contrast, no households were excluded from our initial sample, households were grouped according to household private income, and EMTRs were measured by comparing the tax/transfer experience of households similar in composition and income.

Harding and Polette's estimates, which are reported in Column 7 of Table 1, are generally lower than ours, but the high sample standard deviations associated with our results and the absence of estimates of standard deviations of their estimates precludes a formal comparison. In particular our study finds evidence of much higher average EMTRs in the lower income deciles. There are several possible reasons for this: first, the comparison of EMTRs for disposable household income deciles with those for equivalent disposable family income deciles can only be approximate; secondly, our EMTRs include estimates of the effect of changes in indirect taxes paid and benefits received as private income increases; thirdly, Harding and Polette excluded from their sample a small number of families on the threshold of the family payment income test who may have faced very high EMTRs; and, finally, Harding and Polette excluded families whose labour force participation was likely to have been low.

Our EMTR estimates can be adjusted to reflect labour force participation by calculating weighted average EMTRs for each decile where the weights are the share of each household in the labour earnings of the decile. The weighted EMTRs are reported in Column 4 of Table 1 and the sample standard deviations in Column 5. The weighting has little effect on the EMTR estimates for households in higher

income deciles suggesting that the tax-transfer system is not a significant deterrent to labour force participation for these groups. For households in the three lowest deciles weighting substantially lowers the estimated EMTRs: households whose members are not in the labour force because of age or inability to work tend to be found in the lower income deciles and tend to have high EMTRs because of benefit programmes; and some households whose members have low earning capacity may self-select out of the labour force because they face high EMTRs; since these groups of households with relatively high EMTRs report no labour earnings they receive no weight in the calculation of the weighted average. The sample standard deviations are significantly lower than in the unweighted case: all estimates are significantly different from zero, and this probably reflects a greater degree of homogeneity among households participating in the labour force than in the sample of households as a whole.

4. CONCLUSIONS

Our results suggest that the structure of EMTRs is highly regressive as a result of Australia's targeted welfare system. The structure of EMTRs reported in Table 1 also indicates that the target is fairly broad: the EMTRs suggest that at least half of the households in the country are beneficiaries of one scheme or another. The high EMTRs at the lower end of the income distribution may not, by themselves, be a source of substantial inefficiency: for many households they are a result of an inability to work, and the average potential earnings of those households which choose not to work because of excessively high EMTRs are likely to be low. On the other hand, the broader the target the larger is the amount of tax revenue required to finance the benefit programmes: with one exception, EMTRs are consistently in excess of 40 percent in the higher income deciles which contribute the bulk of the tax revenues. Reductions in the quantity of labour supplied by these high earning households as a result of high EMTRs are likely to involve significant economic losses. A recent study by Campbell and Bond (1997b), updating the Bascand and Porter study, and using weighted average EMTRs for gross income deciles, estimated that a marginal expansion of the tax-transfer system would cost $1.76 for each dollar transferred to net gainers.

The magnitude and structure of the EMTRs also have implications for the provision of public goods. Whether financed through taxation or borrowing, public good provision involves either increasing or not reducing tax revenues. Estimates of EMTRs, together with estimates of labour supply elasticities can be used to calculate the additional dead-weight loss associated with a marginal expansion of the tax-transfer system. An increase in EMTRs, with the quantity of labour held constant, would obviously provide an additional amount of tax revenue. However, when the quantity of labour supplied falls as a result of the tax increase, there are two offsetting effects on the amount of funds available for public good provision: the forgone tax revenues on the quantity of labour withdrawn from the market; and the additional tax revenues need to finance the increased eligibility for benefits as a result of the decline in earnings. The former effect represents an efficiency or dead-weight loss to the economy, and while the latter effect is a transfer it also

influences the cost of public funds because of the need for higher tax rates to fund the expansion of benefit programmes as well as the public good. A recent study by Campbell and Bond (1997a), updating the Findlay and Jones estimates, indicates that there is a dead-weight loss in the range 19-24 cents for every dollar allocated to public good provision in Australia.

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